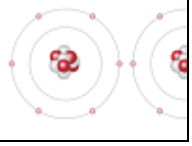
Activity B: **Building molecules**	Get the Gizmo ready: • Click **Reset**. • Turn off **Show Lewis diagram**. • Select **Oxygen**.	

Question: How do atoms share more than one pair of electrons?

1. Observe: Like fluorine and most other elements, oxygen atoms are most stable with a full complement of eight valence electrons.

   A. How many valence electrons does each oxygen atom have now? _____

   B. How many more electrons does each oxygen atom need to be stable? _____

2. Form a bond: Drag electrons back and forth until the molecule of oxygen (O_2) is stable. Click **Check** to confirm your molecule is stable. Take a snapshot and paste the image into your document (don't forget to label it "O_2").

   How many *pairs* of shared electrons are there in a stable molecule of oxygen? _____

3. Draw a diagram: Draw a Lewis diagram of the oxygen molecule in the space below at left. To check your work, turn on **Show Lewis diagram**. Draw the correct diagram on the right.

   Practice diagram: **O O** Actual: **O O**

4. Practice: Create covalent bonds and stable molecules for the remaining substances. Take a snapshot of each completed molecule and add it to your document. Draw Lewis diagrams for each one. (As above, draw the diagram on your own before checking your work.)

Nitrogen	**N N**	Ammonia	**H** **H N H**
Chlorine	**Cl Cl**	Methane	**H** **H C H** **H**
Water	**H O H**	Formaldehyde	**O** **H C H**
Carbon dioxide	**O C O**		

(Activity B continued on next page)

Activity B (continued from previous page)

5. Count: Review the Lewis diagrams you drew on the previous page. Note that each element tends to form a certain number of chemical bonds. This value is the **valence** of the element.

   For each element in the table below, use the Gizmo to find the number of valence electrons and the list the valence based on the Lewis diagram. Then find the sum of these numbers.

Element	Symbol	# of valence electrons	Valence	Sum
Fluorine	F			
Hydrogen	H			
Oxygen	O			
Nitrogen	N			
Chlorine	Cl			
Carbon	C			

6. Make a rule: If you knew the number of valence electrons in a nonmetal atom, how would you determine the valence of the element? (Hint: Ignore hydrogen for now.)

   _____

   _____

7. Analyze: The first shell can hold a maximum of two electrons. How does this explain the valence of hydrogen?

   _____

   _____

8. Apply: Selenium has six valence electrons. What is the valence of selenium? _____

9. Think and discuss: The last column of the periodic table contains the **noble gases**, elements that do not easily form chemical bonds.

   Why don't these gases tend to form chemical bonds? _____

   _____

   _____

   _____